

Miller/Walker and Salmon Basin Plan Executive Committee and Project Management Team Meeting

Date: Friday February 20, 2004

Time: 9:00AM – 11:00AM

Location: City of Burien Council Chambers

Meeting Summary

Attendees

Executive Committee

Rod Hansen	King County
Elizabeth Leavitt	Port of Seattle
Gary Long	City of Burien
Merlin McReynold	City of Normandy Park
Bruce Rayburn	City of SeaTac

PMT

Dan Bath	City of Burien
Bruce Bennett	King County
Steve Clark	City of Burien
Bob Duffner	Port of Seattle
Roger Kuykendall	Gray & Osborne (for the City of Normandy Park)
Dale Schroeder	City of SeaTac

Kimberly Lockard from King County Councilmember Julia Patterson's office was also present.

Executive Committee Discussion of Upcoming Public Meetings

The purpose of the meeting was for the PMT to brief the Executive Committee on its proposed presentation to the public at meetings scheduled for March 11 (Salmon Creek) and March 18 (Miller and Walker Creek). Bruce Bennett gave an overview of the activities that the PMT had pursued since the last Executive Committee meeting in September 2003. He also discussed the PMT's desire to prepare a public draft of the basin plans by approximately mid-year and receive approval of the plans by year-end. Gary Long asked if we could accelerate the schedule at all. The PMT members said they would explore that option, but they were concerned that the schedule was already tight. Merlin McReynold and Bruce Rayburn cautioned that we have made good progress to date and don't want to risk that by trying to rush the project too much.

Action items are highlighted

The Executive Committee offered a number of comments on the draft materials for the public meetings; there were three issues of particular interest – the proposed estuary restoration idea, the technical option to pursue a by-pass line, and the headwater wetland in Walker Creek.

Proposed Estuary Restoration Idea

The PMT is proposing that if the fish restoration goal is pursued (an approximate 10-fold increase in adult spawners for the combined Miller/Walker watershed), then a discussion of estuary restoration must occur. The Executive Committee agreed that the estuary option should be included in the public presentation, but that we need to ensure that the following messages are clear:

The concept of estuary restoration needs to be pursued if the fish restoration goal is agreed to.

When this plan talks about estuary restoration, we do NOT mean the estuary restoration project previously proposed (the study completed by King County that evidently did not include good communication and cooperation with the Community Club).

We want to work with the Community Club to cooperatively design and implement an acceptable estuary restoration project over time.

We need to ensure that the Community Club property owners understand that the basin plan will improve conditions for them with respect to flooding, erosion, and water quality. We're not proposing that the Community Club make all the sacrifices and not receive any benefit.

We are well aware that the Cove is privately-owned property and are not proposing to ignore or violate people's property rights.

Worrying about nomenclature is not a productive exercise – whether it's called an estuary or salt marsh or anything else is not important; what is important from a scientific basis is to restore some of the habitat benefits of an area with mixed fresh and salt water.

By-pass Line Option for Flow Control

The PMT has been considering a by-pass line as one option for flow control in Miller Creek. The by-pass line option would consist of a 36-inch pipe that would travel from the Ambaum regional detention facility to Puget Sound. It would convey up to approximately 100 cfs of storm water from the most heavily developed sub-basin in Miller Creek – the commercial area along 1st Av S. The by-pass line would not receive any flow from the Port of Seattle and in no way would affect the Port's required mitigation for its proposed third runway. Hydrologic modeling of the by-pass option showed that it did significantly reduce flows in Miller Creek. Another flow control option being examined, regional detention, showed even better results.

The Executive Committee determined that the PMT should not further consider the by-pass option. They believed that the by-pass would be much more difficult to implement

because of the need to obtain easements and construct a new outfall to Puget Sound. They also like that fact that the regional detention option could be implemented largely on publicly-owned property and would achieve more flow reduction at a comparable, if not less, cost. Elizabeth Leavitt stated that the PMT should work closely with the Port as it further explores the regional detention option as the current proposal involves expansion of the Miller Creek Regional Detention Facility, which is located on Port property.

Walker Creek Headwater Wetland

Kimberly Lockard stated that the headwater wetland for Walker Creek will hopefully soon be purchased. King County has allocated \$300,000 in conservation futures funding to the project and is cooperating with Burien and Normandy Park to raise the remaining \$150,000 needed, some of it perhaps from other grant sources. The property owner is willing to sell and the 21-acre acquisition would permanently protect the important wetland.





Other Issues

There was a discussion of potential changes in NPDES permitting and the impacts to the Port. The Port offered to brief the cities on its storm water program and discuss its various permits. Steve Clark wanted to ensure that mention was made of potential projects along WSDOT right-of-way. He is interested in the PMT continuing to pursue the removal of asphalt and concrete channels along SR 509 and SR 518 as a means to reduce flows and improve water quality.



Upcoming PMT meeting dates – 2/26

Public meetings on 3/11 (Salmon) and 3/18 (Miller/Walker)

Attachments

Executive Committee agenda	 022004agenda.doc
Summary of activities to date	 activitysummary.doc
Proposed basin goals	 "Proposed Basin Goals.doc"
Summary overview of problems	 "Summary Overview of Problems.doc"

Action items are highlighted

Summary of Management options	 ManagementOptions execsum.doc
Management options	 ManagementOptions exec.doc

**Executive Committee Meeting
Miller/Walker/Salmon Basin Plan
February 20, 2004**

Agenda

Purpose: To receive Executive Committee approval of proposed content for public meetings in March.

1. Recap of activities to date
2. Proposed basin goals
3. Proposed management options
4. Proposed schedule

**Summary of Miller/Walker/Salmon Basin Plan Activities
February 20, 2004**

Spring, summer, and fall 2002 – Field surveys of basins, problem identification, model calibration

November 2002 – Salmon PMT field trip

December 2002 – ILA signed by project partners

January 2003 – Executive Committee meeting

February 2003 – Miller/Walker PMT field trip

April 2003 – Executive Committee meeting

April 2003 – Web page on-line

July 2003 – Normandy Park added to ILA

September 2003 – Executive Committee meeting

September 2003 – Salmon basin public meeting

October 2003 – Miller/Walker basin public meeting

December 2003 – Rough draft of basin plans to PMT

Proposed Activities

March 2004 – Salmon and Miller/Walker public meetings

May 2004 – Public Review Draft of basin plans

July 2004 – Final Draft of basin plans, begin approval process

Proposed Basin Goals
February 20, 2004

Miller and Walker Creek

Flow regime goal

Improve the current flow regime by more closely approximating the flow regime expected under a land coverage of 75% forest, 15% grass, and 10% impervious area.

Water quality goal

Improve existing water quality to support habitat by reducing pollutants in storm water run-off. In highly developed areas where metal pollution is likely to be a problem, achieve 50% removal of total zinc and 80% removal of total suspended solids. In less intensively developed areas where metal pollution is less likely to occur, achieve 80% removal of total suspended solids.

Habitat goal

Protect existing areas of high-quality habitat; and improve degraded habitat by reducing erosive flows, thereby allowing formation of in-stream food sources and spawning areas, and restoring the most important areas of habitat. Fulfillment of the goal should result in an increase in anadromous fish usage from its current level of approximately 200 returning spawners per year to approximately 2000 returning spawners per year (an approximate 10-fold increase for the combined Miller and Walker basins).

Salmon Creek

Flow regime goal

Maintain the current flow regime in Salmon Creek by continuing to use the by-pass line to approximate the flow regime expected under a land coverage of 75% forest, 15% grass, and 10% impervious area. Reduce flooding in the upper watershed.

Water quality goal

Improve existing water quality by reducing pollutants in storm water run-off. In highly developed areas where metal pollution is likely to be a problem, achieve 50% removal of total zinc and 80% removal of total suspended solids. In less intensively developed areas where metal pollution is less likely to occur, achieve 80% removal of total suspended solids. Reduce phosphorus and fecal coliform levels in Lake Hicks so that water quality standards are met.

Habitat goal

Protect existing areas of good habitat; improve degraded habitat over time as funding is available.

Summary Overview of Problems

February 20, 2004

Miller/Walker basin

Geology problems

- Lack of finer sands and gravels
- Some areas eroded down to till
- Lack of varied particle sizes
- Some areas of excessive erosion
- Some areas of excessive deposition

Hydrology problems

- Current flow regime too erosive – need to reduce peak flows and flow durations
- Some local areas of flooding

Ecology problems

- Lack of stream complexity
- Lack of intact riparian corridor
- Lack of functioning estuary
- Culvert and detention facility are fish passage barriers

Water quality problems

- Limited data show fairly high levels of some pollutants in highly-developed areas, especially metals

Salmon basin

Geology problems

- No serious problems; some erosion in ravine but appears to be occurring at “natural” rate

Hydrology problems

- No serious problems in stream, provided that by-pass line continues to function
- Routine flooding in some areas of the upper watershed

Ecology problems

- No documented fish use for approximately 20 years
- Lack of estuary
- Heavily armored stream bank
- Lack of stream complexity
- Culvert is fish passage barrier

Water quality problems

- Limited data show fairly high levels of some pollutants in highly-developed areas, especially metals
- Lake Hicks polluted with phosphorus and fecal coliform bacteria

Miller Creek Management Options Summary Table

Option	Public Cost	Relative Effectiveness*
<i>Flow Control</i>		
Regulations only	\$0	Low
Regional detention facilities and regulations	\$2,200,000	High
By-pass line and regulations	< \$3,700,000 – cost to be shared with private sector	Medium
<i>Water Quality</i>		
Regulations only	\$0	Low
Paint guardrails, remove stream from asphalt ditch, and regulations	\$1,000,000	Medium
Treatment facilities and regulations	\$850,000	High
Future retrofits identified through monitoring program	\$?	High
<i>Habitat</i>		
Estuary restoration	\$2,500,000	High
Culvert modification at 1 st Av. S	\$500,000 - \$1,000,000	High if estuary restored Low if estuary not restored
Add riser to sewer manhole	\$50,000	Low
Remove concrete weirs	\$350,000	Low
Purchase property and conservation easements	Variable	High
<i>Monitoring and Stewardship</i>		
Annual costs – combined with Walker Creek	\$100,000	High

* A qualitative evaluation of timeliness and cost-effectiveness in meeting one of the management goals. Not a measure of feasibility.

Walker Creek Management Options Summary Table

Option	Public Cost	Relative Effectiveness*
<i>Flow Control</i>		
Regulations only	\$0	Medium
Low-impact development retrofits plus regulations	\$?	High
<i>Water Quality</i>		
Regulations only	\$0	Low
Guardrail painting and regulations	\$300,000	Medium
Future retrofits identified through monitoring program	\$?	High
<i>Habitat</i>		
Estuary restoration	Included in Miller cost	High
Headwater wetland purchase/protection through existing regulations	\$925,000/\$0	High
Purchase property and conservation easements	Variable	High
<i>Monitoring and Stewardship</i>	Included in Miller cost	High

* A qualitative evaluation of timeliness and cost-effectiveness in meeting one of the management goals. Not a measure of feasibility.

Salmon Creek Management Options Summary Table

Option	Public Cost	Relative Effectiveness*
<i>Flow Control</i>		
Regulations only	\$0	Medium
Regional detention facilities and regulations	\$950,000	High
<i>Water Quality</i>		
Regulations only	\$0	Low
Treatment facilities and regulations	\$300,000	Medium
Future retrofits identified through monitoring program	\$?	High
<i>Habitat</i>		
Estuary restoration	\$4,000,000	Medium
Replace culvert under Shorewood Drive	\$375,000	High if estuary restored Low if estuary not restored
Purchase property and conservation easements	Variable	High
<i>Monitoring and Stewardship</i>		
Annual costs	\$50,000	High

* A qualitative evaluation of timeliness and cost-effectiveness in meeting one of the management goals. Not a measure of feasibility.

Miller Creek Flow Regime Management Options

Option	Public Cost	Pros	Cons
<i>Flow Control</i>			
<u>Regulations only</u> Level 2 (75/15/10) detention standard	\$0	<ul style="list-style-type: none"> • Large improvement in flow regime • Easy to implement • No expenditure of limited public funds • Consistent with Port's detention requirements • Appropriate restoration standard for urbanized basin 	<ul style="list-style-type: none"> • Will not reach goal flows for basin • Only new development and re-development pays • Cost could be impediment to development • May take a long time for improvements to occur
<u>Detention facilities and regulations</u> Miller Creek Regional Detention Facility – increase by 40 ac-ft to 130 ac-ft Ambaum Pond – increase from 2.5 ac-ft to 15 ac-ft City Light Property – 12 ac-ft plus Level 2 (75/15/10) detention standard	Miller Creek RDF - \$400,000 (Chin) Ambaum Pond - \$600,000 (rough est.) City Light - \$1,200,000 (Kato and Warren) Total \$2,200,000	<ul style="list-style-type: none"> • Will reach goal flows for basin • More equitable cost share between public and private • Can see benefits to stream sooner 	<ul style="list-style-type: none"> • Requires public funding source • Cities incur additional operation and maintenance responsibility and liability • Limited space to expand or construct new detention facilities • Miller Creek RDF option increases wildlife hazard potential at airport unless control measures are used
<u>By-pass line and regulations</u> Construct 36" HDPE by-pass line approximately 2 miles from 1 st Av. S to Puget Sound to convey 100 cfs plus Level 2 (75/15/10) detention standard except no detention for Ambaum Pond sub-basin (but may need to contribute to conveyance upgrades)	\$3,700,000 (Chin) Cost could be shared with private sector	<ul style="list-style-type: none"> • Will largely achieve goal flows for basin (not entirely) • More equitable cost share • Can see benefits to stream sooner • May encourage development and re-development in commercial area of Burien • Might allow Ambaum Pond to be converted to wq treatment only 	<ul style="list-style-type: none"> • Requires public funding source • Cities incur additional operation and maintenance responsibility and liability • Must obtain permission for new discharge to Puget Sound • Must cross private property in certain locations

Miller Creek Water Quality Management Options

Option	Public Cost	Pros	Cons
<i>Water Quality</i>			
<u>Regulations only</u> New development and re-development to provide enhanced treatment for high-impact land uses; recommend minimizing galvanized materials	\$0	<ul style="list-style-type: none"> Will remove not only 80% TSS but also 50% of total metals; metals are likely to be a primary pollutant in the basin 	<ul style="list-style-type: none"> Treatment will only be provided as development and re-development occurs, so likely to take a long time
<u>Paint existing galvanized highway guardrails, remove stream from asphalt ditch, and regulations</u>	\$1,000,000 (Moini + 50%) for guard rails along 2 miles of highway; removing asphalt ditch along part of 509	<ul style="list-style-type: none"> Will treat polluted water from existing development Runoff from galvanized surfaces a major source of zinc Reduces PAH input to stream (from asphalt) and provides habitat improvement 	<ul style="list-style-type: none"> Guardrail coating requires periodic maintenance Access could be an issue Need to ensure not to damage road prism
<u>Treatment facilities and regulations</u> Construct capital projects to provide water quality treatment (see below)		<ul style="list-style-type: none"> Provides treatment on a sub-basin level No need to wait for development to occur 	<ul style="list-style-type: none"> Expensive Treatment may not be as effective as treatment at the source
<u>1. Hermes Depression</u> Move intake lines to pumps to floating platform	\$100,000 (rough est.)	<ul style="list-style-type: none"> Existing large detention area Relatively simple modifications 	<ul style="list-style-type: none"> Ensure that flood protection capacity is not reduced
<u>2. Ambaum Pond</u> Create an additional 10 ac-ft of dead storage or large sand filter treatment	\$500,000 (rough est.)	<ul style="list-style-type: none"> Basin draining to facility has large number of pollutant sources – treatment here will benefit basin 	<ul style="list-style-type: none"> Space is extremely limited Need to acquire adjacent property
<u>3. City Light Property</u> Include a treatment facility in addition to the detention – facility would be either dead storage or sand filter	\$250,000 (rough est.)	<ul style="list-style-type: none"> Provides treatment at a site in combination with detention 	<ul style="list-style-type: none"> Need property owner willing to sell
<u>Future retrofits identified through monitoring</u>	\$?	<ul style="list-style-type: none"> Specific projects can be designed to treat specific areas of need 	<ul style="list-style-type: none"> Need to wait for data analysis Need to continue to fund monitoring

Miller Creek Habitat Management Options

Option	Public Cost	Pros	Cons
<i>Habitat</i>			
<u>Estuary restoration</u> Re-create functioning estuary by removing some fill material and establishing estuary plantings	\$2,500,000 (Fetherston)	<ul style="list-style-type: none"> • Critical to restoring fish populations • Would benefit not only Miller and Walker Creeks, but Puget Sound • Relatively easy to do • Benefits are nearly immediate • Provides habitat for amphibians and birds 	<ul style="list-style-type: none"> • Strong opposition from private property owners who own the land
<u>Culvert modification at 1st Av. S</u> Existing culvert is fish passage barrier because it's too steep and flow velocities are too high – either retrofit or replace	\$500,000 - \$1,000,000 (rough est.)	<ul style="list-style-type: none"> • Improved passage for juvenile salmonids 	<ul style="list-style-type: none"> • May be of limited value if estuary not restored • Could be a bird attractant hazard near airport
<u>Add riser to sewer manhole</u> Sewer manhole submerged in Miller Creek just downstream of 1 st Av S culvert – contact SWSSD to address	\$50,000 (rough est.)	<ul style="list-style-type: none"> • Prevents de-watering of stream and excessive I/I in sewer 	<ul style="list-style-type: none"> • Requires coordination with sewer district and work in the stream
<u>Remove concrete weirs</u> Weirs in stream bed just downstream of submerged sewer manhole	\$350,000 (rough est.)	<ul style="list-style-type: none"> • Restoring gravels in area provides habitat 	<ul style="list-style-type: none"> • Weirs supposedly provide protection for sewer line • Requires coordination with sewer district and work in the stream
Purchase property or conservation easements whenever possible	Variable	<ul style="list-style-type: none"> • Will provide habitat and allow options for future management strategies 	<ul style="list-style-type: none"> • Jurisdictions have limited funds • Often difficult to convince elected officials of importance of preservation

Miller and Walker Creek Monitoring and Stewardship Management Options

Option	Public Cost	Pros	Cons
<i>Monitoring and Stewardship – Annual Costs</i>			
<p><u>Flow, water quality, and habitat monitoring</u> Establish an on-going environmental monitoring program to collect basic hydrologic information (precipitation and stream flow), water quality data (temp, DO, hardness, fecals, nutrients, metals), and habitat data (fish counts, B-IBI)</p>	<p>\$50,000 Annual Cost (rough est.)</p>	<ul style="list-style-type: none"> • Will allow evaluation of effectiveness of regulations, capital projects, and operations and maintenance practices • Only way to be able to tell if stream is improving or not 	<ul style="list-style-type: none"> • Requires on-going financial commitment • Often difficult to convince elected officials of its importance
<p><u>Basin stewardship</u> Fund a half-time position to coordinate public outreach and information, including an annual report on basin condition, coordination of volunteer activities, and distribution of LID and wq source control information</p>	<p>\$50,000 Annual Cost (rough est.)</p>	<ul style="list-style-type: none"> • Offers one-stop shopping for citizens interested in the health of the basin • Serves as a point of coordination within and between agencies • Provides good public relations 	<ul style="list-style-type: none"> • Requires on-going financial commitment • Often difficult to convince elected officials of its importance • Potential to cause conflict between jurisdictions because must be advocate for stream, not employers

Walker Creek Flow Regime Management Options

Option	Public Cost	Pros	Cons
<i>Flow Control</i>			
<u>Regulations only</u> Level 2 (75/15/10) detention standard	\$0	<ul style="list-style-type: none"> • Large improvement in flow regime • Easy to implement • No expenditure of limited public funds • Consistent with Port's detention requirements • Appropriate restoration standard for urbanized basin 	<ul style="list-style-type: none"> • Will not reach goal flows for basin, but stream looks to be in good shape • Only new development and re-development pays • Cost could be impediment to development • May take a long time for improvements to occur
<u>Low-impact development retrofits plus regulations</u> Infiltrate run-off from roofs, driveways, parking lots, roads, and sidewalks if not already done	\$?	<ul style="list-style-type: none"> • Should be relatively easy to do in Walker Creek because of outwash • Provides water quality benefits 	<ul style="list-style-type: none"> • Need access to private property • Potentially strong public opposition • Question about responsibility for future O&M

Walker Creek Water Quality Management Options

Option	Public Cost	Pros	Cons
<u>Regulations only</u> Require new development and re-development to provide enhanced treatment for high-impact land uses	\$0	<ul style="list-style-type: none"> Will remove not only 80% TSS but also 50% of dissolved metals, a primary pollutant in the basin 	<ul style="list-style-type: none"> Treatment will only be provided as development and re-development occurs, will likely take a long time
<u>Guardrail painting and regulations</u> Paint existing galvanized highway guard rails to reduce leaching of zinc	\$300,000 (Moini + 50%) for painting guard rails along 2 miles of highway – may be cheaper to replace	<ul style="list-style-type: none"> Will treat polluted water from existing development Runoff from galvanized surfaces a major source of zinc 	<ul style="list-style-type: none"> Guardrail coating requires periodic maintenance
<u>Determine wq protection needed for headwater wetland</u> May need bog protection standard, adjoining storage facility may need wq treatment	\$500 (rough est.)	<ul style="list-style-type: none"> Determination of type of headwater wetland will allow appropriate wq protections to be put in place 	<ul style="list-style-type: none"> May require special wq protection regulations in area that may cause additional treatment expenditures for certain property owners
<u>Future retrofits identified through monitoring</u>	\$?	<ul style="list-style-type: none"> Specific projects can be designed to treat specific areas of need 	<ul style="list-style-type: none"> Need to wait for data analysis Need to continue to fund monitoring

Walker Creek Habitat Management Options

Option	Public Cost	Pros	Cons
<i>Habitat</i>			
Estuary restoration	Included in Miller cost	See above	See above
Headwater wetland delineation and survey	\$5000 (rough est.)	<ul style="list-style-type: none"> Will allow type of wetland to be identified and boundaries accurately mapped 	<ul style="list-style-type: none"> None
Headwater wetland purchase or conservation easement	\$925,000 for purchase (Burien appraisal)	<ul style="list-style-type: none"> Will permanently protect wetland flow, water quality, and habitat functions 	<ul style="list-style-type: none"> Need to have willing property seller Regulations could be relied on to protect wetland – why spend \$ to purchase?
Purchase property or conservation easements whenever possible	Variable	<ul style="list-style-type: none"> Will provide habitat and allow options for future management strategies 	<ul style="list-style-type: none"> Jurisdictions have limited funds Often difficult to convince elected officials of importance of preservation

Salmon Creek Flow Regime Management Options

Option	Public Cost	Pros	Cons
<u>Regulations only</u> Level 1 detention standard	\$0	<ul style="list-style-type: none"> • Meets goal flow for basin • Will protect conveyance system and maximize benefit of existing by-pass line • Less costly for developers 	<ul style="list-style-type: none"> • Does not effectively address existing flooding problems in the upper watershed – need capital improvements in upper watershed
Detention facilities and regulations Examine existing by-pass line to assess condition Modify by-pass outfall to address broken manhole Reduce flooding at Mallard Lake with property purchase and drainage improvements White Center Regional Pond drainage improvements	Examine by-pass -- \$1500 (Chin) Modify by-pass outfall -- \$50,000 (Chin) Mallard Lake -- \$750,000 (rough est.) White Center Regional Pond -- \$150,000 (rough est.) Total -- \$952,000	<ul style="list-style-type: none"> • Will address existing flooding problems at Mallard Lake 	<ul style="list-style-type: none"> • Cost is relatively high to address flooding problems in small area

Salmon Creek Water Quality Management Options

Option	Public Cost	Pros	Cons
<u>Regulations only</u> Require new development and re-development to provide enhanced treatment for high-impact land uses, may also have lake protection standard for Lake Hicks	\$0	<ul style="list-style-type: none"> Will remove not only 80% TSS but also 50% of dissolved metals, a primary pollutant in the basin Will require additional phosphorus control 	<ul style="list-style-type: none"> Treatment will only be provided as development and re-development occurs, will likely take a long time
<u>Mallard Lake</u> – plantings to reduce use by ducks and geese, posted fecal coliform levels, bioswale	\$150,000 (rough est.)	<ul style="list-style-type: none"> Will address some of the existing fecal coliform problems Will provide a regular update to citizens regarding wq 	<ul style="list-style-type: none"> Citizens near lake may like lots of ducks and geese
<u>Lake Hicks</u> – Alum treatment to prevent algal blooms due to excess phosphorus inputs to lake	\$150,000 initially, \$50,000 every 3 years or so (Abella)	<ul style="list-style-type: none"> Will reduce phosphorus level in the lake 	<ul style="list-style-type: none"> Alum needs to be re-applied every several years Alum won't address high fecal coliform counts
<u>Future retrofits identified through monitoring</u>	\$?	<ul style="list-style-type: none"> Specific projects can be designed to treat specific areas of need 	<ul style="list-style-type: none"> Need to wait for data analysis Need to continue to fund monitoring

Salmon Creek Habitat Management Options

Option	Public Cost	Pros	Cons
Estuary restoration	\$4,000,000 (rough est.)	<ul style="list-style-type: none"> • Could create habitat that is very limited in Puget Sound • Would benefit fish, amphibians, and birds 	<ul style="list-style-type: none"> • Property owner has not expressed interest in the past • Limited fisheries potential relative to high cost
Replace culvert under Shorewood Drive	\$375,000 (Chin)	<ul style="list-style-type: none"> • Would allow fish passage into relatively good habitat areas upstream 	<ul style="list-style-type: none"> • Of limited value without estuary project • Limited fisheries potential relative to high cost
Purchase property or conservation easements whenever possible	Variable	<ul style="list-style-type: none"> • Will provide habitat and allow options for future management strategies 	<ul style="list-style-type: none"> • Jurisdictions have limited funds • Often difficult to convince elected officials of importance of preservation

Salmon Creek Monitoring and Stewardship Management Options

Option	Public Cost	Pros	Cons
<i>Monitoring and Stewardship – Annual Costs</i>			
<p><u>Flow, water quality, and habitat monitoring</u> Establish an on-going environmental monitoring program to collect basic hydrologic information (precipitation and stream flow), water quality data (temp, DO, hardness, fecals, nutrients, metals), and habitat data (fish counts, B-IBI)</p>	<p>\$25,000 Annual Cost (rough est.)</p>	<ul style="list-style-type: none"> • Will allow evaluation of effectiveness of regulations, capital projects, and operations and maintenance practices • Only way to be able to tell if stream is improving or not 	<ul style="list-style-type: none"> • Requires on-going financial commitment • Often difficult to convince elected officials of its importance
<p><u>Basin stewardship</u> Fund a quarter-time position to coordinate public outreach and information, including an annual report on basin condition and coordination of volunteer activities</p>	<p>\$25,000 Annual Cost (rough est.)</p>	<ul style="list-style-type: none"> • Offers one-stop shopping for citizens interested in the health of the basin • Serves as a point of coordination within and between agencies • Provides good public relations 	<ul style="list-style-type: none"> • Requires on-going financial commitment • Often difficult to convince elected officials of its importance • Potential to cause conflict between jurisdictions because must be advocate for stream, not employers